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Morris Arboretum Bulletin

THE UNIVERSITY OF MICHIGAN
APR 26 1960
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MARCH, 1960

VOL. 11 NUMBER 1

Science Library
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Chionanthus virginicus

Published by
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The Morris Arboretum Bulletin is published quarterly at Philadelphia, Pa., by the Associates of the Morris Arboretum, Chestnut Hill, Philadelphia 18. Subscription, $1.00 for four issues. Single copies, 30 cents. Free to Associates.

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Arboretum Activities

THE STAFF

On Friday, February 12, the Director addressed the annual meeting of the Pennsylvania Nurserymen's Association at the Warwick Hotel. The subject of his lecture was "Plant Exploration in Southeastern Asia." On February 17, he spoke to the Society of Little Gardens of Philadelphia on the topic, "A Botanist in India."

Dr. Li gave an illustrated lecture to the Garden Workers in Ardmore on January 18. His talk was entitled "The History of the Japanese Gardens." On March 22, he spoke to the Four Counties Garden Club on "Japanese Gardens and their Plants" and on March 24 he addressed the Philadelphia Botanical Club on the topic, "A Trip to the Far East – Hong Kong, Formosa and Japan."

On January 13, Dr. Allison spoke to the Wyoming Valley Garden Club at Wilkes Barre, Pennsylvania, on "Dividends from the Fungal World," and on March 1, she gave an illustrated lecture entitled "Fungal Jungle" to the members of the Comstock Society.

HORTICULTURAL SOCIETY AWARD

At the Spring Luncheon of the Pennsylvania Horticultural Society, held on Tuesday, March 8, the Morris Arboretum was given the Society's Certificate of Merit Award, "In recognition of outstanding service to the community and the individual, through research, education and display in the field of horticulture."

(Continued on page 6)

Chionanthus in the Philadelphia Area

JOHN M. FOGG, JR.

One of the most attractive tall shrubs or small trees to bloom in this area during mid to late May is *Chionanthus,* known commonly as Fringe-tree or Old-man's beard. This genus belongs to the Oleaceae or Olive Family which in addition to the olive of commerce, includes the lilacs (*Syringa*), the privets (*Ligustrum*), the ashes (*Fraxinus*), the jasmine (*Jasminum*), and the Forsythias.

The flowers of the Fringe-tree are borne in panicles which are either pendant or somewhat spreading. The whitish corollas are composed of four extremely narrow petals which are free nearly to the base, imparting to the inflorescence the appearance of a fine mass of snowy tinsel.

All species of *Chionanthus* are reputed to be dioecious, or at least functionally so. The male flowers bear two stamens with a small, abortive or functionless ovary between them .The female flowers have an ovary, with a well developed stigma, and a pair of anthers, but the cells of the latter are reported as usually remaining closed. However, Rehder (1904), after studying this situation, came to the conclusion that plants of *Chionanthus* are pseudo-monoclinous and Wilson and Wood (1959) refer to them as polygamo-dioecious, that is, chiefly dioecious but occasionally with bisexual and unisexual flowers on the same plant.

Most authors agree that the petals of male flowers are longer and narrower than those of the female.

The fruit of the Fringe-tree is an ovoid dark blue or purplish drupe which lends added interest to the plants in late summer and autumn.

The opposite leaves are simple and vary in shape from ovate-lanceolate to elliptic or oblong. They assume a bright lemon-yellow color in the fall providing an attractive contrast with the bluish fruits. In the spring the flowers and leaves develop simultaneously, so that the latter form a green background for the feathery appearance of the former.

In Rehder's Manual two species of *Chionanthus* are recognized as being in cultivation in this country: *C. virginicus* L., [1] a native of eastern North America and *C. retusus* Lind. & Paxt., which occurs in China, Korea and Japan.

[1]Although the names of most genera of trees are feminine, an exception exists in the case of those which end in "anthus."

THE AMERICAN FRINGE-TREE

The common American Fringe-tree, *C. virginicus,* occurs naturally from southern New Jersey and southern Pennsylvania to Missouri, Oklahoma, Florida and Texas. It is, however, cultivated far north of its natural limits of distribution.

It is a tall shrub or small tree, up to 10 meters, (about 30 feet) usually found in acid soils in swampy woods, along stream banks or on rocky bluffs. The large oval to obovate or lanceolate leaves are dark green and lustrous above, somewhat paler beneath, and turn a bright yellow color in the autumn.

The flowers are borne in loose, gracefully drooping panicles and the narrowly linear, pure white petals are from 2 to 3 cm. long. (Fig. 1).[2] The number of petals, although characteristically four, may be as many as five or six, especially in the staminate flowers. The purplish or bluish drupes are about 2 cm. in length.

Fig. 1. *Chionanthus virginicus* showing inflorescence.

Typical *C. virginicus* has the mature foliage and inflorescences essentially smooth. However, there is a form occasionally found in cultivation in this area in which the under surfaces of the leaves and the branches of the panicles are decidedly hairy or pubescent. This is apparently what has been called var. *maritimus* Pursh (var.

[2]Photographs by Dr. H. L. Li.

Fig. 2. *Chionanthus virginicus.*
Plant on slope below Baxter Memorial.

pubescens Dipp.) One such specimen at the Morris Arboretum has leaves which are narrower and more pointed at the apex than is the case with typical *C. virginicus.* It is obvious that this species is extremely variable and is in need of further detailed study.

In our region the American Fringe-tree generally blooms between May 15 and 20, and retains its flowers for a week or ten days, depending upon the weather. When fully out it eminently deserves its generic name (from *chion,* snow, and *anthus,* flower). Whether grown as an isolated plant (Fig. 2) or grouped together against a background of taller vegetation (Fig. 3) it is richly entitled to a place in any collection.

It is gratifying to record that this species is widely cultivated in the Philadelphia area and that its popularity appears to be increasing steadily.

Another American species, *C. pygmaeus* Small, is a low shrub, spreading by underground stems, with petals about 1 cm. long. It is restricted to the lake region of central Florida where it occurs on scrub ridges and sandhills. (Small, 1933).

In Barton's Flora Virginica (1812) there appears a reference to *C. rosea* with the following comment, "I am assured that Mr. Clayton discovered in Virginica, and cultivated in his garden, a species, or variety of Fringe-tree, with rose-coloured blossoms. I presume it was nothing but a variety of the common Chionanthus virginica: and it is said that similar specimens of this shrub have been observed in other parts of the United States." For a fuller discussion of Barton's Flora see Pennell (1926).

While a pink-flowered Fringe-tree would be a distinct and valued addition to eastern American horticulture, we have no information concerning the existence of this variety either in the wild or in cultivation.

The Oriental Fringe-tree

The Oriental or Chinese Fringe-tree, *C. retusus,* is smaller in most respects than its American congener. It is seldom more than 5 to 6 meters (16 to 20 feet) in height and its leaves are usually much shorter than those of *C. virginicus.* The panicles are borne at the ends of lateral shoots and are nearly horizontal, whereas those of the American species are drooping (Fig. 4). Also, the petals are shorter and slightly wider than those of our plant and the species blooms from three or four days to a week later. Most persons who know the two are inclined to believe that the American form is the more showy.

As might be expected in a species with such a wide geographical range, *C. retusus* is also extremely variable, especially with respect to the size and shape of the leaves.

The specific name *retusus* is generally applied to plants in which the leaves are shallowly notched at the apex. Although none of our plants possesses foliage of this kind, there are several specimens growing at the Arnold Arboretum in which the leaves are distinctly retuse. Fig. 5 is a photograph of an herbarium specimen of such a plant which I collected there in October, 1958. Mr. A. J. Fordham, the propagator at the Arnold, has

Fig. 3. *Chionanthus virginicus.*
Group of plants in Oleaceae section.

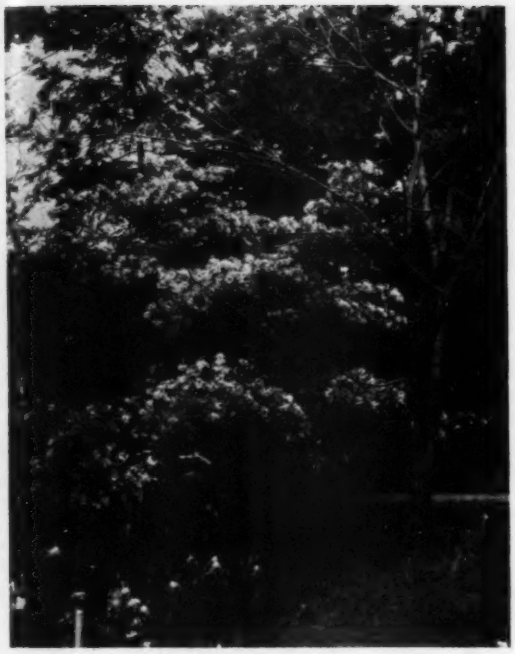

Fig. 4. *Chionanthus retusus.*

promised to send us rooted cuttings of this material.

Most of the specimens of *C. retusus* which we have seen in cultivation in our area have leaves with broadly rounded apices. Unfortunately, too little is known about the geographic origin of these plants to permit of any correlation between leaf-shape and distribution in the wild.

Still another variation may be seen in the character of the leaf margin. Several years ago we received from the Taylor Arboretum two specimens of *C. retusus* in which the leaves were finely but sharply serrulate (Fig. 6).

These differed markedly from other plants in our collection in which the leaf-margins were entire. A search through the literature revealed the fact that Hayata (1913) had described a new species from Formosa which he named *C. serrulatus,* adding that in the Tokyo Herbarium there is another specimen of this species from the mainland of China. Koidzumi (1925) reduced this to a variety of *C. retusus* and Rehder and Wilson (1927) stated that they consider it merely a juvenile form of this species, affirming that young plants of *C. retusus* always have serrulate leaves.

We can not establish the age of the plants which we received from the Taylor Arboretum, but they are about 2 meters tall and have produced flowers. Furthermore, at the Arnold Arboretum there are several mature specimens in which the leaves are distinctly serrulate. It is thus difficult to accept the suggestion that serrulate leaf margins are inevitably associated with young growth. We are therefore labeling our plants *C. retusus* var. *serrulatus* and at the same time recognizing that here again, as with *C. virginicus,* a tremendous amount of careful morphological and genetical work is required to bring about a better understanding of this complex population.

According to Rehder (1940), *C. retusus* was originally introduced into cultivation in 1845 and reintroduced in 1879. Although less widely planted in our area than its American relative, it is nonetheless a highly desirable shrub. Its somewhat wider and pure white petals lend greater substance to the panicles and its habit of flowering slightly later and remaining in bloom rather longer than *C. virginicus* renders it a valuable supplement to that species.

At the Morris Arboretum we have planted the two species in close proximity in a newly developed area, near the Langstroth Bee Garden, in which we are bringing together all hardy members of the Olive Family. In the background

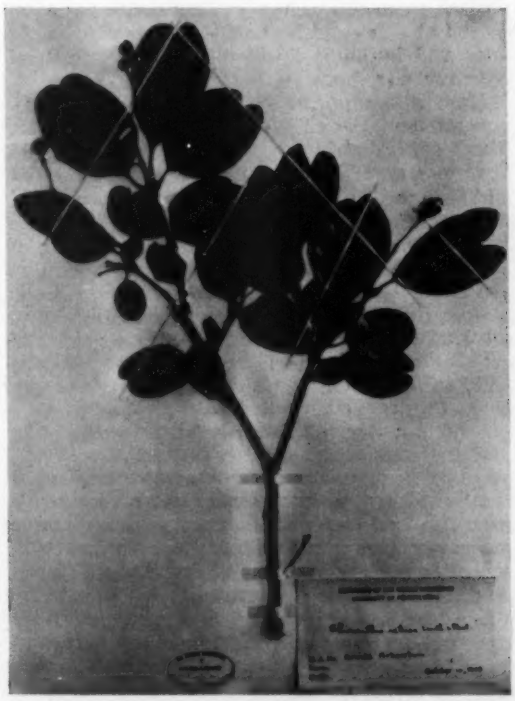

Fig. 5. *Chionanthus retusus.* Form with notched leaves.

Fig. 6. *Chionanthus retusus* var. *serrulatus*.

we have massed mature specimens of the taller American Fringe-tree and in front of them are the lower more horizontal plants of its cousin from the Far East.

REFERENCES

Barton, B. S. 1812. Flora Virginica. 2. Philadelphia.

Hayata, B. 1913. Ic. Pl. Formosanarum. 3: 150.

Koidzumi, G. 1925. Bot. Mag. Tokyo. 39: 5.

Pennell, F. W. 1926. The elder Barton — his plant collection and the mystery of his floras. Bartonia. 9: 17-34. Philadelphia.

Rehder, A. 1904. The pseudo-monoclinism of *Chionanthus virginica*. Rhodora. 6: 18-20.

Rehder, A. 1940. Manual of cultivated Trees and Shrubs. MacMillan. New York.

Rehder, A. & E. H. Wilson. 1927. Journal Arnold Arb. 8: 191.

Small, J. K. 1933. Manual of the southeastern flora. 1042. New York.

Wilson, K. A. & C. E. Wood, Jr., 1959. The genera of Oleaceae in the Southeastern United States. Journ. Arnold Arb. 40: 369-384.

Arboretum Activities

(Continued from Page 2)

New Plantings

As usual, much of our activity during late autumn and early winter was devoted to moving plants from our nurseries to their permanent positions on the grounds. The major area involved at this time is the 70 acre tract formerly known as Bloomfield which lies to the north of Northwestern Avenue.

Here will be located the "home" of such important families as Berberidaceae, Saxifragaceae, Rosaceae, Leguminosae, Oleaceae, and Caprifoliaceae. Room is also provided for several smaller and less spectacular groups, such as Rutaceae and Rhamnaceae.

Mass plantings have already been started of *Malus, Prunus, Syringa, Ligustrum, Chionanthus, Forsythia, Lonicera* and *Viburnum*. A basic planting of *Rhamnus* has been established and the Rutaceae is represented by several species of each of the following: *Phellodendron, Evodia* and *Zanthoxylum*.

Cherry Row

Of special interest to our visitors this spring will be a newly planted double row of Oriental cherries along the lower roadway which extends from the wooden bridge westward to the native azalea area. Formerly this road was flanked by a row of hawthorns on one side and a row of lilacs on the other. The hawthorns have been badly afflicted by disease which has necessitated their removal and the lilacs are, for the most part, outmoded varieties which have been replaced by better material.

The new planting includes some forty young trees representing three species and fourteen forms which have been carefully selected to demonstrate both single and double flowers ranging from white to deep pink. Following is the list of species and cultivars with their common names:

Prunus Sieboldii	Naden Cherry
P. serrulata	
albo-rosea	'Shirofugen'
contorta	'Fukuroki'
fugenzo	'Fugenzo'
hatazakura	'Hatazakura'
Kwanzan	'Kwanzan'
Meigetsu	'Meigetzu'
moutan	'Botan-zakura'
nobilis	'Akebono'
ojochin	'Ojochin'
oshibayama	'Oshibayama'
yubida	'Benden'
senriko	'Senriko'
shirotae	'Mount Fuji'
versicolor	'Yae-akebono'
P. yedoensis	Yoshino Cherry

Plant Distribution Days

The practice of making our annual distribution of plants to our Associates in the spring, rather than in the autumn, proved so popular last year that we are repeating it.

The dates which have been selected are Friday and Saturday, May 20 and 21. Prior to this event our associates will receive individual announcements together with a list of the material which will be available.

J. M. F., Jr.

Western and Southern Oaks in The Michaux Quercetum

FRANK S. SANTAMOUR, JR.[1]

The Michaux Quercetum is a joint project of the Morris Arboretum of the University of Pennsylvania and the Northeastern Forest Experiment Station of the Forest Service, U. S. Department of Agriculture, financed in part by the Michaux Fund of the American Philosophical Society. One of the aims of this project, as outlined by Schramm and Schreiner[2] is to provide preliminary tests on the adaptability of exotic oak species to the Philadelphia region. As a start 74 individual seed collections of oak species native to the western and southern United States were planted during 1953 and 1954. Acknowledgments to cooperators who assisted in this work have been made in previous reports.[2 3]

Seed collections of about 100 acorns were made from individual trees in the South and West. Two replicates of the acorns of each species were planted in the late fall in special seedbeds designed for maximum protection against rodent damage. Seedlings that developed from acorns planted in the fall of 1953 suffered only negligible damage from rodents. However, in spite of the protective measures, seedlings from the 1954 sowing were almost 100-percent topped by rabbits during the winter of 1955-56. None of the 1954 seedlings of the less hardy southern and western species survived the combination of animal damage and the more severe climate of the Philadelphia area. Thus, data for these species include one-year height growth for seedlots in both years of planting, but survival and dieback are reported only for those seedlots planted in 1953.

The seedlings were transplanted to rows in the nursery area before leafing out the second spring. Winter mortality was investigated after the trees had begun to grow; thus mortality due to transplanting was confounded with winter-killing. However, since Li[3] pointed out that the average first-year mortality for eastern and northern species was almost 5 percent, it has also been assumed that any figure beyond this, even for southern and western species, can be interpreted as due to winter-killing.

Observations made for three years on the oak species indigenous to the western and southern United States will be discussed in alphabetical order. Data on seedling survival were taken in the spring of the third growing season.

WESTERN OAKS

Quercus agrifolia Née, the California or coast live oak, is a native of the Coast Ranges of California south to Baja California, Mexico. The specific name *agrifolia* (literally field-leaved) probably originated as a printing error for *acrifolia* (sharp-leaved) or *aquifolia* (hollyleaf), for the leaves are persistent for one year and may have the spinose teeth characteristic of *Ilex*. The three collections of this species were from areas 750-1,500 feet in elevation where the growing season ranged from 220 to 331 days. Germination ranged from 82 to 90 percent, and the average first year growth of 31 cm. was among the best for all oak species. However, after the first winter 95 percent of the seedlings were dead, and the remaining trees had suffered some dieback. None of these trees survived the second winter.

Quercus chrysolepis Liebm., canyon live oak, is another native of the Coast Ranges from southern Oregon to Baja California and also occurs on the western slopes of the Sierra Nevada. A somewhat shrubby form. var. *Palmeri* (Engelm.) Sarg., is found in New Mexico, Arizona, southern California, and Baja California. The evergreen leaves are dimorphous, being either hollylike or with nearly entire margins. The two collections came from regions between 2,200 and 6,025 feet in elevation. The average first-year height was 14 cm. and there was no real difference between sources. Two collections of var. *Palmeri* from California averaged 18 cm. in height for the first growing season. Only one seedlot of the species was planted in 1953, and two seedlings survived the second winter.

Quercus Douglasii Hook & Arn. is known generally as blue oak. Other common names such as western white oak and mountain white oak are misnomers, since the species is now considered to belong to the red oak group. The deciduous leaves of this species may be oval and entire or lobed. The six collections in the Quercetum were all from the species' restricted range in the foothills of the California Coast Ranges from 900 to

[1]The author is a geneticist on the staff of the Northeastern Forest Experiment Station, U. S. Forest Service. He is stationed at the Morris Arboretum of the University of Pennsylvania, where the Experiment Station and the Arboretum cooperate in genetics research.

[2]Schramm, J. R., and Schreiner, Ernst J. 1954. The Michaux Quercetum. Morris Arboretum Bulletin 5: 54-57.

[3]Li, Hui-Lin. 1955. A progress report on the Michaux Quercetum. Morris Arboretum Bulletin 6: 45-47.

2,300 feet. First-year growth averaged 17 cm. Germination of the two seedlots sown in 1953 was 81 percent, and, although most of the seedlings succumbed or suffered dieback during the first winter, 25 trees were still alive after the second winter. Although this species may reach heights of 50 to 80 feet, its low-quality wood makes it undesirable as a forest tree.

Quercus dumosa Nutt. is usually a small shrub 3 to 10 feet high, and it well deserves the common name of California scrub oak. However, it sometimes becomes a small tree is parts of its range from northern California to Baja California. Five seedlots of this species, grown in the Quercetum, had an average germination of 78 percent and a first-year height of 21 cm. Twenty-five seedlings of the three seedlots planted in 1953 survived two winters, but they suffered considerably from dieback.

Quercus durata Jeps., the leather oak, is sometimes known as *Q. dumosa* var. *bullata* Englem. It is a shrub with a more restricted range than *Q. dumosa*. Its shrubby nature is reflected in the average first-year height of 12 cm. No trees of the five seedlots of this species survived two winters in Philadelphia.

Quercus Gambelii Nutt., the Gambel or Rocky Mountain white oak has a range that takes in parts of most of our southwestern states. All of the five collections in the Quercetum (two each from Colorado and Utah and one from Arizona) are from elevations over 7,000 feet. It is a slow-growing species commonly 20-25 feet tall, and after the first year in the nursery it averaged only 8 cm. in height. The Colorado and Utah seed collections were from areas of more severe climate than that of Philadelphia, and survival for all seedlots was between 22 and 25 percent after two years.

Quercus Garryana Doug. is known as the Oregon white oak, although its range extends from southern British Columbia south to around San Francisco, California. This species is seldom more than 50-70 feet in height, and it generally has poor forest form. The seven seedlots in the Quercetum (two each from Washington and Oregon and three from California) were collected from elevations between 225 and 1,700 feet. The two Washington collections planted in 1953 are a good example of the variation between trees of the same species in transmitting vigor to their offspring. Although the trees from which the seed was collected were only 1½ miles apart along the same road the one-year-old seedlings from one tree averaged 22 cm. in height, while seedlings from the other tree were only 8 cm. tall. Two-year survival was 31 and 34 percent for the Washington collections and 16 percent for the single California seedlot planted in 1953.

Quercus Kelloggii Newb., the California black oak, has a range that extends from the Mackenzie River in Oregon south in the Coast Ranges to San Diego County, California, and it is also found in the Sierra Nevada. This is a slow-growing species, and it is usually of inferior form over most of its range. Three collections of this species were made in California and four in Oregon from altitudes between 450 and 2,000 feet. The single California seedlot planted in 1953 had an average first-year height of 43 cm., whereas the two Oregon seedlots planted the same year averaged only 18 cm. The height of this California collection was the best for all seedlots in the Quercetum. Seedlings of California origin were also taller than those from Oregon in the seedlots planted in 1954, but the difference was less marked.

The California seedlot was from an area in Monterey County with an average January temperature of 50° F. and a growing season of 250 days. The Oregon seedlots were from Josephine County, where the climate was more severe, with an average January temperature of 36° F. and a 155-day growing season. One might have expected that the Oregon seedlings would be less affected by the Philadelphia winter, but this was true only for the first year. Thirty percent of the California seedlings died during the first winter and 62 percent showed signs of dieback, while only 18 percent of the Oregon trees were dead and 19 percent had died back. However, after the second winter, only 16 percent of the seedlings from Oregon were still alive as compared to 69 percent survival of the seedlings from California. This difference may be due to the large root system built up by the California trees, which enabled them to sprout vigorously even after the stem had been killed back for a considerable length.

Quercus lobata Née, the California white or valley oak, is truly the king of the western species of *Quercus*. It is a fast-growing tree and is commonly 90-125 feet in height with a diameter of 3 to 5 feet. The crown is usually wide-spreading, and an open-grown tree has the appearance of the familar English oak (*Q. robur*). For all its magnificence, however, it is of little utility to man, for the wood is not of the best quality. This species occurs only in California, generally in the foothills of the Sierra Nevada. The five collections in the Quercetum are from areas of 500 to 1,000 feet in elevation. First-year growth averaged 36 cm. First-year mortality was 32 percent, and dieback occurred on 33 percent of the trees. Survival after the second winter was 50 percent for the three seedlots planted in 1953.

Quercus Sadleriana R. Br., the deer oak, occurs from southern Oregon through the Sis-

kiyou and Klamath Mountains to Trinity County, California. Both collections in the Quercetum are from Trinity County, California, and they were planted in 1954. First-year height averaged 8 cm.

Quercus turbinella Greene, the shrub live oak, is sometimes regarded as a variety of *Q. dumosa*. This species seldom is more than 15 feet tall, and the one-year-old seedlings of three seedlots averaged 11 cm. in height. The two seedlots from California planted in 1954 were lost, but two seedlings of a seedlot from Arizona planted in 1953 survived two winters.

Quercus vaccinifolia Kellogg, the Huckleberry oak, is sometimes considered a variety of *Q. chrysolepis*. It is a shrubby species, and the two seedlots from California planted in 1954 averaged only 6 cm. in height at the end of the first year.

Quercus Wislezeni A. DC., the interior live oak, is similar in many respects to the coast live oak, *Q. agrifolia*. However, as evidenced by their common names, the two species seldom meet in nature. The range of *Q. Wislezeni* is from Mt. Shasta south along the inner Coast Ranges and the Sierra Nevada to Baja California. Although it is generally shrubby in habit, it may reach heights of 60-80 feet under optimum conditions. First-year growth in the nursery averaged 21 cm. for the seven collections in the Quercetum. Like its coastal counterpart, this species did poorly in the Philadelphia region. In the three 1953 seedlots, 96 percent of trees were dead or had died back after the first winter, and none survived the second.

Collections were also made of *Q. grisea* Leibm. (gray oak), *Q. hypoleucoides* A. Camus (silverleaf oak), and *Q. oblongifolia* Torr. (Mexican blue oak) from Arizona. These seedlots failed to germinate.

Southern Oaks

Quercus Chapmanii Sarg. is called the Chapman oak. It is a little-known species occurring in the coastal plain from southeastern South Carolina to southern Florida. First-year growth of the single Florida collection was only 6 cm., and 92 percent of the trees were dead or had died back after the first winter. No trees survived two winters in Philadelphia.

Quercus incana Bartr. includes *Q. cinerea* Michx. and is known as the bluejack oak. This species inhabits the coastal plain from Virginia to Texas and is also found north to Oklahoma. Two collections from Texas were included in the Quercetum. First-year growth was 21 cm., and although mortality and dieback during the first winter was extremely severe, 19 seedlings were still alive at the beginning of the third growing season.

Quercus laevis Walt. is called the turkey oak and is found along the coast from South Carolina to Florida, where it also occurs on the interior sand hills. This species is a small tree of no commercial importance. The single Quercetum collection from Florida was planted in 1954 and had a one-year height of 8 cm.

Quercus myrtifolia Willd., the myrtle oak, is also a native of the southern coastal plain. The single collection from Florida averaged 8 cm. in height the first year. Seventy-two percent of the trees died during the first winter and none survived the second.

Quercus Nuttalli Palmer, the Nuttall oak, has been known as a distinct species only since 1927. Its range is not well known although it occurs in the bottomlands of the lower Mississippi Valley and also is Alabama. The species can be seperated from pin oak (*Q. palustris*) and scarlet oak (*Q. coccinea*) by characteristics of the fruit. In its native habitat Nuttall oak may reach heights of 100-120 feet in virgin stands, and in the nursery the seedlot from Mississippi averaged 41 cm. in height the first year. There was no mortality the first winter, although 37 percent of the trees had some dieback. Survival after two years was 93 percent.

Quercus pumila Walt. is known as the running oak and has been considered a variety of *Q. cinerea* Michx. by some authors. This species is another native of the coastal plain and sandhills from North Carolina to Mississippi. A single seedlot from Florida was planted in the Quercetum in 1954 and the first-year height averaged 14 cm.

Quercus virginiana Mill., the live oak, is the only important "evergreen" oak of eastern North America. The leaves, which are usually entire, persist until the following spring. The heavy, strong wood of this species made it extremely important in the shipbuilding of the early United States. This species is found along the coastal plain from Virginia to Texas. It occurs also in Mexico. Three seedlots (two from Virginia and one from Florida) were included in the Quercetum and the first-year height of 5 cm. was among the lowest for all oaks. Mortality during the first winter was extremely high, and no trees survived the second winter.

Discussion

It appears that the oak species from the western and southern United States which have been studied in the Quercetum have very little future as ornamentals or forest trees in the Northeast. The evergreen or live oaks simply cannot survive the rigorous winters in sufficient numbers to justify their use. The rest of the species, which have little ornamental value, also have growth and wood characteristics that are generally in-

ferior to native northeastern species. One possible exception is *Q. Nuttalli,* which should be investigated further.

ACKNOWLEDGMENTS

The Michaux Quercetum has been a truly cooperative project since its inception. Personnel of the Morris Arboretum of the University of Pennsylvania, originally supervised by former director, J. R. Schramm, and now under the direction of John M. Fogg, Jr., have been responsible for nearly all the contacts with seed collectors and most of the nursery work. H. L. Li and Mary O. Milton have handled the accession records and herbarium specimens.

The measurement and evaluation phases of the project are under the direction of Ernst J. Schreiner of the Northeastern Forest Experiment Station, U. S. Forest Service. David Hammond of the Arboretum staff and Ernst J. Schreiner, W. J. Gabriel, H. C. Kettlewood, and the author, all members of the Northeastern Station staff, have participated in measurement and evaluation of data at various times. In addition, Jonathan W. Wright, formerly with the Station and now on the staff of Michigan State University, made some of the measurements on this project.

Note: All individuals of *Q. Douglasii, Q. dumosa, Q. Gambelii, Q. Garryana, Q. incana, Q. Kelloggii, Q. lobata,* and *Q. turbinella* that had survived three years in this area were lost during the dry summer of 1957 because of inadequate watering facilities at a cooperating nursery. *Q. Nuttalli* has been outplanted at Longwood Gardens.

Associates' Corner

AROUND THE WORLD AT THE ARBORETUM

No passports are required. You do not even have to be vaccinated. The library at the Arboretum is situated in a bright, sunny room with a large reading table and comfortable chairs. One generally thinks of arboretum libraries as shelves filled with technical books of reference and, although the Morris Arboretum has an outstanding collection of these, it also offers a vast assortment of literature of great interest to the layman.

Our library is one of 30 affiliated and departmental branches of the library system of the University of Pennsylvania. Although there is no full-time librarian here, Miss Elizabeth Shinn, of the Cataloguing Division of the Main Library, visits the Arboretum about once a month and keeps our catalog and shelf-list in perfect order.

The Arboretum has a verifax machine which enables it to copy paragraphs or pages from any book or pamphlet. Requests for data and information from all parts of the world make this device of great value. There also exists a system of inter-library loans with other organizations.

As in the past, the December issue of the Bulletin contained a selected list of books added throughout the year to the library. Hope you kept it.

When new books, journals and articles arrive they are put on Dr. Fogg's desk. After he has perused them (Heaven knows when he gets time) he attaches to each a printed slip headed "Please check and circulate." Only after the item has been seen by every member of the staff is it placed in its appropriate spot on the library shelves.

Incidentally, the Arboretum receives botanical and horticultural periodicals from every section of the United States and many foreign countries. Most of these are received in exchange for this Bulletin which is sent all over the world.

To give you an idea of the tremendous geographic coverage of the library some of the basic floras include: Reichenbach's "Icones Florae Germanicae," Coste's "Flore de la France," Hooker's "Flora of British India," Ridley's "Flora of the Malay Peninsula," Standley's "Trees and Shrubs of Mexico," Macbride's "Flora of Peru," and many more. Also many books on Trees and Shrubs of the United States and foreign parts, general gardening, rock and water gardens and house plants.

One whole section consists of books on Landscape Architecture and on the gardens of the United States, England, France, China, Japan, etc. The Associates' dues help materially toward enlarging the library, and members are welcome to browse, borrow, or avail themselves of the copying service.

Recently I had a lovely trip through Portuguese gardens with a beautifully illustrated book, sitting in the nice warm library while the snow fell and the wind whistled outside. Afterwards I went into the jungles with a book on Plant Exploration. We are indeed privileged to have such a splendid resource so accessible. The library is a fascinating place and I highly recommend a fireside trip in it, or if you are planning a trip some familiarity with the vegetation you will encounter will greatly enhance your tour.

MARION W. RIVINUS

Flower Show Exhibit

JOHN M. FOGG, JR.

Upon invitation of the Pennsylvania Horticultural Society the Morris Arboretum arranged an exhibit of ivies for display in the Philadelphia Flower Show which was held during the week of March 7.

The Arboretum's collection of ivies has long been recognized as one of its most distinguished assets. The entire issue of our Bulletin for May, 1956,[1] was devoted to an illustrated article on these plants by Dr. George H. M. Lawrence, an eminent authority on the genus *Hedera*. In speaking of the problem of keeping separate the different clones of ivy, Dr. Lawrence has this to say: "This difficulty has been resolved at the Morris Arboretum by growing each kind on separate trees of a very beautiful double row of oaks. This collection, started there in 1945, is the best outdoor display of ivy clones known to me anywhere in this country or in Europe."

It therefore seemed highly appropriate to us that in mounting our exhibit we should attempt to convey an impression of the manner in which our ivies are grown at the Arboretum. We were extremely fortunate in engaging the services of a young Philadelphia artist, Mr. Christopher Davis, to paint a picture of "Oak Avenue," portraying the double row of oaks with ivies growing on their trunks. This painting, which was 20 feet long and 9 feet high, provided an effective and realistic background for our display of living plants. (Figs. 7, 8 and 9).[2]

Incidentally, Mr. Davis, in addition to being an artist is also a writer and a teacher. His novel, "Lost Summer", was recently made into a play entitled, "There was a Little Girl," which enjoyed a successful run in Philadelphia during February.

Although not in competition, our exhibit was awarded the coveted Bulkley Medal of the Garden Club of America, an honor in which every member of the Arboretum family takes the greatest pride.

The citation which accompanies this medal reads as follows:

"The Bulkley Medal of the Garden Club of America is awarded to an exhibition of ivies by

[1]Volume 7, No. 2: 19-31.

[2]Photographs by E. B. Gilchrist, Jr.

Fig. 7. General view of exhibit.

Fig. 8. Detail of exhibit.

the Morris Arboretum of the University of Pennsylvania.

"An interesting collection of the many forms of *Hedera Helix,* cleverly staged against an appropriate background suggesting the habit of growth at the Arboretum.

"An outstanding demonstration of distinction, clearly labeled, and with an educational legend, makes this an exhibit of special merit."

Although nearly every member of our staff had a hand in this undertaking, a major portion of the credit for its success must go to our Superintendent, Mr. John Tonkin, who for several months devoted himself assiduously to the assembling, preparation, and arrangement of the living material.

An attractively mounted rustic sign accompanying our exhibit bore the following legend:

"Displayed in this exhibit is a reasonably complete collection of the many cultivated forms of *Hedera Helix* or English Ivy, together with representatives of three additional species: *H. canariensis,* Algerian Ivy; *H. colchica,* Colchican Ivy; and *H. rhombea,* Japanese Ivy. A bigeneric hybrid, *Fatshedera Lizei,* is also on display, along with the two parental species, *H. Helix* and *Fatsia japonica.*

"English Ivy provides a striking example of the origin of garden forms by mutation and selection. The numerous forms are widely used as climbers or ground covers, or grown for indoor decoration. While some, particularly the varieties of *H. canariensis,* are primarily grown as house plants, most of the others have proved hardy as outdoor plants at the Morris Arboretum, where a permanent outdoor collection is maintained as depicted on the background panel of this exhibit."

The following 85 varieties or cultivars of *Hedera Helix* were included in our display:

Alice Fletcher
Albany
var. *baltica*
Big Leaf Variegated
Big Deal
Bulgaria
Buttercup
California
Cavendishii
Cordifolia
Crested
Curly Leaf
Deltoides
Digitata
Discolor
Elegantissima
Emerald Gem
Emerald Jewel
Erecta
Fan
Fanette
Fluffy Ruffles
Garland
Glacier
Glymii
Gold Dust
Good Self-branching
Gracilis
Green Crown
Green Quartz
Green Ripple
Green Spear
Hahn's
Hahn's Variegated
Heleri
var. *Helix*
Helvetica
var. *hibernica*
Holly
Ideal
Jubilee
Lace Leaf
Long Point
Maculata
Manda's Crested
Maple Queen
Marshall
Meagherii
Merion Beauty
Minima
Mrs. Pollock
Ontario
Parsley
Patricia
Pedata
Pin Oak
Pittsburgh
Pixie
Rambler
Ray's Supreme
Roehr's Minor
Roumanica
Ruffles
Russell Gold
Ruth
Sagittaefolia
Scutifolia
Seaby Hall
Shamrock
Snowflake
Spear Point
Star
Sweetheart
Sylvanian
Teardrop
Telecurl
Thorndike Sub-zero
Tiny Leaf
Tomboy
Transit Road
Triton
Walthamensis
Weber's Californian
Zwiekers

Fig. 9. Detail of exhibit.